

WE CLAIM:

1. A fastener-driving tool for driving fasteners into a workpiece, said fastener-driving tool comprising:
  - a main body portion having a fastener-driving member disposed therein for driving fasteners into the workpiece;
  - a magazine assembly including a magazine portion configured to receive therein a supply of fasteners to be driven into the workpiece;
  - a nose portion extending from said main body portion, said nose portion having a fastener drive track therein that is configured to receive a header fastener to be driven into the workpiece and that is cooperatively arranged with respect to said main body portion and said fastener-driving member such that upon actuation of said fastener-driving tool, said fastener-driving member drives the fastener that is to be driven out of said drive track and into the workpiece, said magazine assembly further having a fastener feed track that is located between said feed track configured to receive a succession of fasteners from said magazine portion and to guide the succession of fasteners toward and into said drive track; and
  - an actuation mechanism by means of which said fastener-driving tool is actuated to cause said fastener-driving member to drive the headed fasteners into the workpiece;
  - wherein said fastener-driving tool further comprises a reciprocating feed mechanism that advances the succession of fasteners along said fastener feed track to feed successive leading fasteners into said drive track; and
  - wherein said reciprocating feed mechanism further comprises an integrated function member having a check pawl portion and a last-fastener-retaining portion, said integrated function member being configured and operatively disposed relative to said fastener feed track and said fastener drive track such that 1) during general operation of said fastener-driving tool, in

which general operation two or more fasteners remain in the supply to be driven, said check pawl portion of said integrated function member engages the succession of fasteners within said fastener feed track to limit the succession of fasteners from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of fasteners toward said drive track; and 2) such that when a last fastener remains to be driven into the workpiece, said last-fastener-retaining portion holds the last fastener within said drive track to prevent the last fastener from falling out of said drive track without being driven into the workpiece.

2. The fastener driving tool of claim 1 wherein said headed fasteners are headed nails each having a shank and a head on one end of said shank and being collated with the shanks in parallel relation to one another and retained in said parallel relation by flexible elongated structure fixed to the shanks thereof, said magazine portion being configured to retain a succession of collated and retained headed nails formed into a coil formation so as to allow a leading succession of the coil formation to be moved outwardly thereof and into the fastener feed track to be advanced therealong by said reciprocating feed mechanism.

3. The fastener driving tool of claim 2 wherein said last fastener-retaining portion includes an arcuate head engaging surface disposed at a position disposed laterally with respect to the direction of movement of a last headed nail into said drive track, said arcuate surface being biased to move into engagement with a peripheral portion of the head of the last headed nail in said drive track and to grip the engaged head between said arcuate surface and

a laterally spaced opposite arcuate surface of said drive track so that said last headed nail can be driven from said drive track while being gripped.

4. The fastener-driving tool of claim 3, wherein said nose portion further has a drive track access door mounted for movement between a closed operative position and an open access position enabling a user to manually load a new supply of fasteners into said magazine assembly.

5. The fastener-driving tool of claim 4, wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in the operative closed position thereof, said integrated function member is urged toward said fastener feed track.

6. The fastener-driving tool of claim 5, wherein said integrated function member is disposed within a recess formed on a feed-track-facing side of said drive track access door.

7. The fastener-driving tool of claim 5, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

8. The fastener-driving tool of claim 6, wherein said drive track access door has an arcuate portion which matches the shape of the arcuate surface disposed laterally opposite the arcuate surface of said last-fastener retaining portion which defines at least a portion of said drive track and wherein the arcuate shape of said last-fastener-retaining portion matches the arcuate shape of said arcuate portion of said drive track access door, whereby

during the general operation of said fastener-driving tool, the arcuate surface of said last-fastener-retaining portion cooperates with said arcuate surface of said drive track access door to define a portion of said drive track.

9. The fastener-driving tool of claim 3, wherein, said integrated function member has a bearing surface and is biased toward said fastener feed track such that during general operation of the fastener-driving tool, the bearing surface bears against the shanks of said headed nails, which maintains said integrated function member in proper operative position for said general operation of the fastener-driving tool, and wherein said check pawl portion comprises one or more check pawl shoulder portions, each check pawl shoulder portion having 1) a blocking surface that limits the succession of headed nails from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of headed nails toward said drive track; and 2) a cam surface over which the shanks of the succession of headed nails move to push said integrated function member away from said feed track as said reciprocating feed mechanism advances while operating to advance the succession of fastener members toward said drive track.

10. The fastener-driving tool of claim 9, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to manually load a new supply of fasteners into said nose portion and wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track

of said nose portion so as to bias said check pawl shoulder portions toward said fastener feed track.

11. The fastener-driving tool of claim 1, wherein said fastener-driving tool is pneumatically actuated.

12. A fastener-driving tool for driving fasteners into a workpiece, said fastener-driving tool comprising:

- a main body portion having a fastener-driving member disposed therein for driving fasteners into the workpiece;

- a magazine assembly including a magazine portion configured to receive therein a supply of fasteners to be driven into the workpiece;

- a nose portion extending from said main body portion, said nose portion having a fastener drive track therein that is configured to receive a fastener to be driven into the workpiece and that is cooperatively arranged with respect to said main body portion and said fastener-driving member such that upon actuation of said fastener-driving tool, said fastener-driving member drives the fastener that is to be driven out of said drive track and into the workpiece, said drive track having a workpiece-contacting end, said nose portion further having a fastener feed track that is located between said drive and said magazine portion of said fastener-driving tool, said fastener feed track being configured to receive a succession of fasteners from said magazine portion and to guide the succession of fasteners toward and into said drive track; and

- an actuation mechanism by means of which said fastener-driving tool is actuated to cause said fastener-driving member to drive the fasteners into the workpiece;

wherein said fastener-driving tool further comprises a reciprocating feed mechanism that advances the succession of fasteners along said fastener feed track to feed the fasteners into said drive track; and

said reciprocating feed mechanism including an integrated function member having a check pawl portion and a dry fire lock-out portion, said integrated function member being configured and operatively disposed relative to said fastener feed track and said actuation mechanism such that 1) during general operation of said fastener-driving tool, in which general operation approximately two or more fasteners remain in the supply to be driven, said check pawl portion of said integrated function member engages the succession of fasteners within said fastener feed track to limit the succession of fasteners from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of fasteners toward said drive track; and 2) such that when no fasteners remain within said fastener-drive track, said dry fire lock-out portion prevents operation of said actuation mechanism, thereby preventing fastener-driving movement of said fastener-driving member.

13. The fastener-driving tool of claim 12, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to manually load a new supply of fasteners into said magazine assembly.

14. The fastener-driving tool of claim 13, wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track.

15. The fastener-driving tool of claim 13, wherein said integrated function member is disposed within a recess formed on a feed track-facing side of said drive track access door.

16. The fastener-driving tool of claim 15, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

17. The fastener-driving tool of claim 13, wherein said magazine portion includes a magazine cover member by means of which said magazine portion is accessed to load a supply of fasteners into said magazine portion, and wherein said drive track access door and said magazine cover member are cooperatively configured and arranged such that said drive track access door and said magazine cover member can be moved separately or together as a unit, whereby said fastener feed track and said magazine portion are opened and can be accessed simultaneously.

18. The fastener-driving tool of claim 12, wherein said integrated function member has a bearing surface and is biased toward said fastener feed track such that said bearing surface bears against the fasteners and wherein said check pawl portion comprises one or more check pawl shoulder portions, each check pawl shoulder portion having 1) a blocking surface that limits the succession of fasteners from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of fasteners toward said drive track; and 2) a cam surface over which the succession of fasteners move to push said integrated function member away from said feed track as said reciprocating feed mechanism

advances while operating to advance the succession of fasteners toward said drive track.

19. The fastener-driving tool of claim 18, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to manually load a new supply of fasteners into said magazine assembly and wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track so as to bias said check pawl shoulder portions toward said fastener feed track.

20. The fastener-driving tool of claim 19, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

21. The fastener-driving tool of claim 12, wherein said dry fire lock-out portion prevents operation of said actuation mechanism by blocking movement of at least one component of said actuation mechanism.

22. The fastener-driving tool of claim 21, wherein said actuation mechanism comprises a trigger mechanism, a contact arm that is configured and disposed along said nose portion so as to move along said nose portion as a workpiece-contacting end of said drive track is moved toward a fastener-driving location on the workpiece, and a contact arm linkage mechanism operatively interconnecting said trigger mechanism with said contact arm, whereby said trigger mechanism cannot be operated to actuate said fastener-



driving tool until the workpiece-contacting end of said drive track is within a predetermined or preselected distance from the fastener-driving location on the workpiece.

23. The fastener-driving tool of claim 22, wherein said integrated function member is configured and disposed relative to said actuation mechanism such that when no fasteners remain within said magazine assembly, said dry fire lock-out portion prevents operation of said actuation mechanism by blocking travel of said contact arm or said contact arm linkage mechanism.

24. The fastener-driving tool of claim 23, wherein said dry fire lock-out portion comprises a finger-shaped extension extending from a main body portion of said integrated function member.

25. The fastener-driving tool of claim 12, wherein said fasteners are headed nails in a coil formation and said fastener-driving tool is a roofing tool.

26. The fastener-driving tool of claim 25, wherein said fastener-driving tool is pneumatically actuated.

27. A fastener-driving tool for driving fasteners into a workpiece, said fastener-driving tool comprising:

a main body portion having a fastener-driving member disposed therein for driving fasteners into the workpiece;

a nose portion attached to said main body portion, said nose portion having a fastener drive track therein that is configured to receive a fastener to

be driven into the workpiece and that is cooperatively arranged with respect to said main body portion and said fastener-driving member such that upon actuation of said fastener-driving tool, said fastener-driving member drives the fastener that is to be driven out of said drive track and into the workpiece; and an actuation mechanism by means of which said fastener-driving tool is actuated to cause said fastener-driving member to drive the fasteners into the workpiece;

wherein said fastener-driving tool further comprises an integrated function member having a last-fastener-retaining portion and a dry fire lock-out portion, said integrated function member being configured and operatively disposed relative to said drive track and said actuation mechanism such that 1) when a last fastener remains to be driven into the workpiece, said last-fastener-retaining portion holds the last fastener within said drive track to prevent the last fastener from falling out of said drive track without being driven into the workpiece; and 2) such that when no fasteners remain within said fastener-driving tool, said dry fire lock-out portion prevents operation of said actuation mechanism, thereby preventing fastener-driving movement of said fastener-driving member.

28. The fastener-driving tool of claim 37, wherein said nose portion further defines a fastener feed track that is configured to receive a succession of fasteners from a magazine and to guide the succession of fasteners toward and into said drive track, said magazine assembly including a reciprocating feed mechanism for advancing the succession fasteners in guided relation with said feed track so that a leading fastener is moved into said drive track.

29. The fastener driving tool of claim 28 wherein said fasteners are headed nails each having a shank and a head on one end of said shank and

being collated with the shanks in parallel relation to one another and retained in said parallel relation by flexible elongated structure fixed to the shanks thereof, said magazine portion being configured to retain a succession of collated and retained headed nails formed into a coil formation so as to allow a leading succession of the coil formation to be moved outwardly thereof and into the fastener feed track to be advanced therealong by said reciprocating feed mechanism.

30. The fastener driving tool of claim 29, wherein said last fastener-retaining portion includes an arcuate head engaging surface disposed at a position disposed laterally with respect to the direction of movement of a last headed nail into said drive track, said arcuate surface being biased to move into engagement with a peripheral portion of the head of the last headed nail in said drive track and to grip the engaged head between said arcuate surface and a laterally spaced opposite arcuate surface of said drive track so that the last headed nail can be driven out of said drive track while being gripped.

31. The fastener-driving tool of claim 30, wherein said integrated function member is biased toward said fastener feed track by a spring.

32. The fastener-driving tool of claim 31, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to load a new supply of fasteners into said nose portion, and wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track by said spring.

33. The fastener-driving tool of claim 32, wherein said integrated function member is disposed within a recess formed on a drive-track-facing side of said drive track access door.

34. The fastener-driving tool of claim 32, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

35. The fastener-driving tool of claim 30, wherein said fasteners are nails and said fastener-driving tool is a roofing tool.

36. The fastener-driving tool of claim 35, wherein said fastener-driving tool is pneumatically actuated.

37. The fastener-driving tool of claim 27, wherein said dry fire lock-out portion prevents operation of said actuation mechanism by blocking movement of at least one component of said actuation mechanism.

38. The fastener-driving tool of claim 37, wherein said actuation mechanism comprises a trigger mechanism, a contact arm that is configured and disposed along said nose portion so as to move along said nose portion as the workpiece-contacting end of said drive track is moved toward a fastener-driving location on the workpiece, and a contact arm linkage mechanism operatively interconnecting or interlocking said trigger mechanism with said contact arm, whereby said trigger mechanism cannot be operated to actuate said fastener-driving tool until the workpiece-contacting end of said track is

within a predetermined or preselected distance from the fastener-driving location on the workpiece.

39. The fastener-driving tool of claim 38, wherein said integrated function member is configured and disposed relative to said actuation mechanism such that when no fasteners remain within said fastener drive track, said dry fire lock-out portion prevents operation of said actuation mechanism by blocking travel of said contact arm or said contact arm linkage mechanism.

40. The fastener-driving tool of claim 39, wherein said dry fire lock-out portion comprises a finger-shaped extension extending from a main body portion of said integrated function member.

41. The fastener-driving tool of claim 38, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to load a new supply of fasteners into said magazine assembly wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track.

42. A fastener-driving tool for driving fasteners into a workpiece, said fastener-driving tool comprising:

a main body portion having a fastener-driving member disposed therein for driving fasteners into the workpiece;

a magazine assembly having a magazine portion configured to receive therein a supply of fasteners to be driven into the workpiece;

a nose portion attached to said main body portion, said nose portion having a fastener drive track therein that is configured to receive a headed fastener to be driven into the workpiece and that is cooperatively arranged with respect to said main body portion and said fastener-driving member such that upon actuation of said fastener-driving tool, said fastener-driving member drives the fastener that is to be driven out of said drive track and into the workpiece, said nose portion further having a fastener feed track that is located between said drive track and said magazine portion of said fastener-driving tool, said fastener feed track being configured to receive a succession of fasteners from said magazine portion and to guide the succession of fasteners toward and into said drive track; and

an actuation mechanism by means of which said fastener-driving tool is actuated to cause said fastener-driving member to drive the headed fasteners into the workpiece;

wherein said fastener-driving tool further comprises a reciprocating feed mechanism that advances the succession of fasteners along said fastener feed track to feed the leading fastener of the succession of fasteners into said drive track; and

wherein said reciprocating feed mechanism comprises an integrated function member having a check pawl portion, a last-fastener-retaining portion, and a dry fire lock-out portion, said integrated function member being configured and operatively disposed relative to said fastener feed track and said drive track such that 1) during general operation of said fastener-driving tool, in which general operation approximately two or more fasteners remain in the supply to be driven, said check pawl portion of said integrated function member engages the succession of fasteners within said fastener feed track to limit the succession of fasteners from moving away from said drive track as said feed reciprocating mechanism retracts while operating to advance the

succession of fasteners toward said drive track; 2) such that when a last fastener remains to be driven into the workpiece, said last-fastener-retaining portion holds the last fastener within said drive track to prevent the last fastener from falling out of said drive track without being driven into the workpiece; and 3) such that when no fasteners remain within said fastener drive track, said dry fire lock-out portion prevents operation of said actuation mechanism, thereby preventing fastener-driving movement of said fastener-driving member.

43. The fastener driving tool of claim 42, wherein said headed fasteners are headed nails each having a shank and a head on one end of said shank and being collated with the shanks in parallel relation to one another and retained in said parallel relation by flexible elongated structure fixed to the shanks thereof, said magazine portion being configured to retain a succession of collated and retained headed nails formed into a coil formation so as to allow a leading succession of the coil formation to be moved outwardly thereof and into the fastener feed track to be advanced therealong by said reciprocating feed mechanism.

44. The fastener driving tool of claim 43, wherein said last fastener-retaining portion includes an arcuate head engaging surface disposed at a position disposed laterally with respect to the direction of movement of a last headed nail into said drive track, said arcuate surface being biased to move into engagement with a peripheral portion of the head of the last headed nail in said drive track and to grip the engaged head between said arcuate surface and a laterally spaced opposite arcuate surface of said drive track so that the last fastener can be driven out of the drive track while being gripped.

45. The fastener-driving tool of claim 44, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to manually load a new supply of fasteners into said magazine assembly.

46. The fastener-driving tool of claim 45, wherein said integrated function member is operatively connected to said drive track access door and is configured such that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track.

47. The fastener-driving tool of claim 46, wherein said integrated function member is disposed within a recess formed on a feed-track-facing side of said drive track access door.

48. The fastener-driving tool of claim 46, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

49. The fastener-driving tool of claim 44, wherein said drive track access door has an arcuate portion which matches the shape of the arcuate surface disposed laterally opposite the arcuate surface of said last-fastener retaining portion which defines at least a portion of said drive track and wherein the arcuate shape of said last-fastener-retaining portion matches the arcuate shape of said arcuate portion of said drive track access door, whereby during said general operation of said fastener-driving tool, the arcuate surface of said last-fastener-retaining portion cooperates with said arcuate surface of said drive track access door to define a portion of said drive track.



50. The fastener-driving tool of claim 44, wherein said magazine portion includes a magazine cover member by means of which said magazine portion is accessed to load a supply of fasteners into said magazine portion, and wherein said drive track access door and said magazine cover member are cooperatively configured and arranged such that said drive track access door and said magazine cover member can be moved separately or together as a unit, whereby said fastener feed track and said magazine portion are opened and can be accessed simultaneously.

51. The fastener-driving tool of claim 43, wherein said integrated function member has a bearing surface and is biased toward said fastener feed track such that said bearing surface bears against the fasteners and wherein said check pawl portion comprises one or more check pawl shoulder portions, each check pawl shoulder portion having 1) a blocking surface that limits the succession of fasteners from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of fasteners toward said drive track; and 2) a cam surface over which the succession of fasteners move to push said integrated function member away from said feed track as said reciprocating feed mechanism advances while operating to advance the succession of fastener members toward said drive track.

52. The fastener-driving tool of claim 50, wherein said nose portion further has a drive track access door by means of which said fastener feed track is accessed to manually load a new supply of fasteners into said magazine assembly and wherein said integrated function member is operatively connected to said drive track access door and is configured such

that when said drive track access door is in a closed position for operation of said fastener-driving tool, said integrated function member is urged toward said fastener feed track so as to bias said check pawl shoulder portions toward said fastener feed track.

53. The fastener-driving tool of claim 52, wherein said integrated function member is generally lever-shaped and is pivotally mounted near an end thereof to said drive track access door.

54. The fastener-driving tool of claim 42, wherein said fastener-driving tool is pneumatically actuated.

55. A method of retaining a last headed fastener within a fastener drive track of a power-operated fastener-driving tool so as to prevent the last headed fastener from falling out of said drive track without being driven by operation of the tool, said method comprising the steps of:

moving a last headed fastener into said drive track in a predetermined direction,

engaging a head of said last headed fastener in the drive track along a periphery of the head with a first head-engaging surface, at a position disposed laterally with respect to the predetermined direction of movement of the last headed fastener into said drive track, and

applying a force on the head of the last headed fastener by the engagement of said first surface, which force causes the head of the last headed fastener to be biased into engagement with a wall surface defining a portion of the drive track which is laterally opposite from the position of engagement of said first head-engaging surface so that the head of the last

headed fastener is gripped between said first head-engaging surface and said wall surface.

56. A method as defined in claim 55, including the step of driving the last headed fastener from the drive track while it is gripped.

59. In a power-operated fastener-driving tool in which a succession of headed fasteners is moved in a predetermined direction into a fastener drive track so as to be driven therefrom by operation of the power-operated tool, the improvement comprising

a last headed fastener-retaining mechanism constructed and arranged to retain the last headed fastener in said succession of headed fasteners moved into said drive track from falling out of said drive track without being driven therefrom by the operation of the tool,

said last headed fastener-retaining mechanism comprising a member having a first head-engaging surface configured to engage along a periphery of a head of the last headed fastener at a portion disposed laterally with respect to the predetermined direction of movement of the succession of headed fasteners into said drive track, said member being biased to move said first head-engaging surface in a direction laterally toward said drive track so that the engagement thereof with the head of the headed fastener causes the head of the headed fastener to be biased into engagement with a wall surface defining a portion of said drive track which is laterally opposite from the position of engagement of said first surface, whereby the head of the last headed fastener is gripped between said first head-engaging surface and said wall surface.

60. A power operated tool including the improvement as defined in claim 57, wherein said member is an integrated function member which, in

addition to retaining the last headed fastener within the drive track, also has a dry fire lock-out portion which functions in response to driving of the last fastener from said drive track and the subsequently biased movement of the first surface of said member laterally inwardly with respect to the drive track to prevent fastener-driving operation of the tool after said driving of the last fastener from the drive track.

61. A power-operated tool as defined in claim 58, wherein the tool includes 1) a magazine assembly that is constructed and arranged to retain therein a supply of headed fasteners that are held together in a parallel succession by flexible, elongated structure and that are disposed in a coil formation; and 2) a reciprocating feed mechanism that is constructed and arranged to advance a leading succession of headed fasteners along a feed track so that a leading headed fastener is moved into said drive track,

wherein said integrated function member includes a check pawl portion that is configured such that during general operation of said tool, in which general operation approximately two or more headed fasteners remain in the supply to be driven, said check pawl portion engages the succession of headed fasteners within said feed track to limit the succession of headed fasteners from moving away from said drive track as said reciprocating feed mechanism retracts while operating to advance the succession of headed fasteners toward said drive track, and

wherein engagement of the headed fasteners by said check pawl portion prevents the first head-engaging surface of said integrated function member from moving under bias toward the drive track into the position where said first head-engaging surface is able to engage the periphery of the head of a headed fastener.